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Research Article

MANAGEMENT OF LOWER LIMB TRAUMA IN PREGNANCY

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ABSTRACT

Objective: Lower limb fracture in pregnancy is a rare complication. Still, there is limited literature available on the management of these fractures, and perioperative obstetric and orthopedic management of these fractures is largely unclear. Trauma during pregnancy is a common cause of non-obstetrical maternal death and a significant public health burden. This study reviews the common causes of lower limb trauma during pregnancy, morbidity, mortality, and provides a management approach to pregnant patients with lower limb trauma.

Methods: A prospective analysis was conducted in the orthopedics department of Government Medical College, Patiala from 2019–2022 on 30 pregnant patients admitted here with lower limb fractures.18 patients presented with femoral fractures and 12 patients with tibial fractures. Details of the type of fracture and site of fracture, along with the type of intervention, were recorded. Roadside accident was the most common cause of trauma, followed by fall and then assault.

Results: The following observations were made from the data collected during this study in the treatment of 30 cases of lower limb trauma during pregnancy. The mean age of patients in the study was 27 years. The most common cause of trauma was traffic accidents, followed by fall and assault. In our study, 18 patients (60%) presented with femoral fractures, and 12 patients (40%) with tibial fractures. Operative intervention was done for all femoral fractures and 6 tibia fractures.6 tibial fractures were managed conservatively. Among 18 femoral fractures, 15 were operated with plating and 3 with interlocking femur nails. Among 6 operated tibia fractures, 2 were operated with plating and 4 with interlocking tibia nail. All cases were evaluated with risks and benefits of operative treatment, positioning of the patient, type of anesthesia used, use of c-arm, radiation dose, intraoperative fetal monitoring and the risk associated with anesthetic agents, antibiotics, analgesics, and anticoagulants.

Conclusions: Orthopedic trauma during pregnancy is usually associated with significant morbidity and mortality to the mother as well as fetus. A multidisciplinary approach should be used for the successful management of lower limb fractures during pregnancy. The orthopedic surgeon must consider both operative and non-operative measures. Risk and benefits of operative treatment must be weighed carefully. Many fractures during pregnancy can be managed conservatively based on the fracture pattern and displacement. Also, we can delay the operative treatment until after delivery which is often a safe option. In fractures where surgical intervention is necessary, orthopedic surgeons must consider the physiologic changes that accompany pregnancy and the potential risks to the fetus. The surgeon must take care of the proper positioning of the patient, use of the c-arm, radiation dose, and intraoperative fetal monitoring. Furthermore, the risk associated with anesthetic agents, antibiotics, analgesics, and anticoagulants must be taken care of.

Keywords: Orthopedics, Lower limb trauma, Pregnancy.

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INTRODUCTION

Orthopedic trauma during pregnancy is usually associated with significant morbidity and mortality to the mother as well as fetus [1,2]. Bone fracture management in pregnant patients is rare and poorly discussed in the literature. Lower limb trauma during pregnancy and management of that trauma is a difficult task for orthopedic surgeons. It is a challenge because the treating surgeon has to keep in mind the mother as well as fetus. Fetus and mother are both interrelated, and any sort of treatment is going to affect both as well. Trauma in pregnancy increases the Non-obstetric maternal mortality [1]. The management of a pregnant trauma patient is often considered to be complicated. Furthermore, the various anatomical and physiological changes in the mother during pregnancy further complicate the management [3,4]. The most common causes are motor vehicle accidents, falls, assaults, and partner violence [4]. During the treatment of pregnant patient with traumatic injury, one must consider that any sort of treatment is going to affect both mother as well as the fetus. A multidisciplinary approach must be performed, which include orthopedic surgeons, obstetric specialists, anesthesiologists, general trauma surgeons, an emergency medicine team, and nursing staff [5]. Initial management is directed toward the mother. During planning the treatment for a pregnant patient with orthopedic trauma, the surgeon must be aware of the risks of preterm labor, placental abruption, miscarriage, preterm rupture of membranes, and fetal demise. Anatomic and physiological changes during pregnancy must be considered. All of these changes affect fetal and maternal outcomes.

METHODS

The present study was conducted in Orthopedics Department of Government Medical College, Patiala from 2019–2022 on 30 patients admitted here with lower limb trauma in pregnancy.

Inclusion criteria

1. A fracture involving lower limbs in pregnant females.
2. Duration of fracture <2 weeks.
3. Patient was ambulatory before this fracture.

Exclusion criteria

1. Pathological fractures, open fractures, and patients with known disorders of bone metabolism except osteoporosis.
2. Any associated infectious conditions of bone.
3. Duration of fracture >2 weeks.
4. Patients who refused to give consent.

Ethics
Ethical approval was obtained from the board of the ethical committee of the hospital before the initiation of the study.

RESULTS

The following observations were made from the data collected duringthis study in the treatment of 30 cases of lower limb trauma during pregnancy in the Department of Orthopedics, Government Medical College, Patiala, between 2019 and 2022.

- 30 lower limb trauma patients
- The mean age of patients was 27 years
- Traffic accidents (n=22), simple fall (n=6), and violence (n=2)
- Femur fractures in 18 and Tibia fracture in 12
- Operative intervention was done for all femur fractures and 6 tibia fractures
- 6 Tibia fractures were managed conservatively
- Among 18 femur fractures, 15 were operated with plating and 3 with interlocking femur nail.

Age distribution
In our study maximum age was 38 years. Minimum age was 19 years. Mean age was 27 years (Table 1).

Mode of injury
In our study, majority of the cases were road side accident followed by fall (Table 2).

Table 1: Number and percentage of cases in various age group

Age group (in years)	No. of cases
<20	2
20–25	8
26–30	12
31–35	6
>35	2
Total	30

Table 2: Various types of mode of injury

Mode of injury	No. of cases
Fall	6
RSA	22
Assault	2
Total	30

RSA: Road side accident

Side affected
In our study, 16 patients were injured on the right side (53.33%) and 14 were injured on the left side (46.66%) (Table 3).

Type of lower limb trauma
In our study, among 30 patients, 18 suffered from femur fractures and 12 from tibia fractures (Table 4).

Type of intervention
In our study, operative intervention was done for all femur fractures and 6 tibia fractures.

6 tibia fractures were managed conservatively (Table 5 and Fig. 1).

Type of implant used

- Among 18 femur fractures, 15 were operated with plating and 3 with interlocking femur nail (Figs. 2 and 3).
- Among 6 operated tibia fractures, 2 were operated with plating and 4 with interlocking tibia nail (Fig. 4).

DISCUSSION

Orthopedic trauma in pregnancy is a rare event, with an incidence of 1–6% [6]. Though it is uncommon but associated with high maternal as well as fetal morbidity and mortality [7]. Orthopedic trauma in pregnant women presents a challenge for the orthopedic surgeon considering the complexity of the pregnant woman. Initial management is directed toward the mother. During the treatment of the pregnant patient with traumatic injury, one must consider that any sort of treatment is going to affect both mothers as well as fetus. A multidisciplinary approach must be performed, which includes orthopedic surgeons, obstetric specialists, anesthesiologists, general trauma surgeons, emergency medicine team, and nursing staff [7]. An obstetrician specialist in a multidisciplinary team is a must for the initial assessment, stabilization, and subsequent management of a pregnant trauma patient.

In our study, we focussed on the management of lower limb trauma during pregnancy. We used a multi-disciplinary approach for the management of such patients. After initial stabilization of pregnant patients with lower limb trauma, the need for further intervention is decided, which may be operative or conservative. Furthermore, the appropriate anesthetic to be used was determined. We mainly used neuroaxial anesthesia [8]. Intraoperative care and monitoring is one of the mainstay in the management of pregnant patients with lower limb trauma. Positioning of the patient, use of c-arm, radiation dose and intraoperative fetal monitoring are critical steps during management. The left lateral position is considered to be safer as it avoids compression of the inferior vena cava by the gravid uterus [9].

Fig. 1: Case 4 - Tibia fracture managed conservatively

Fig. 2: Case 1 - Femur fracture managed with plating. (a) Pre-operative image (b) Post-operative image

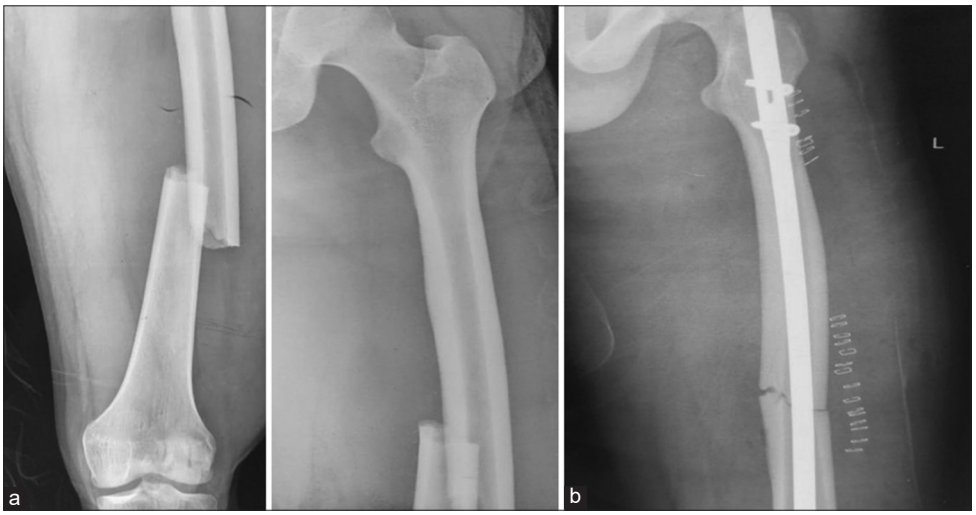

Fig. 3: Case 2 - Femur fracture managed with interlocking femur nail. (a) Pre-operative image (b) post-operative image

Fig. 4: Case 3 - Tibia fracture managed with interlocking tibia nail. (a) Pre-operative image (b) post-operative image

Multi-disciplinary approach also considers continuous intraoperative fetal monitoring with the consultation of neonatologist and obstetrician specialist [10]. Lead apron is used as a shield for intraoperative protection of the maternal abdomen from harmful radiations. The type

Table 3: Number of cases of right and left sides affected

Side	No. of cases
Left	14
Right	16
Total	30

Table 4: Types of lower limb trauma

Type	No. of cases
Femur fractures	18
Tibia fractures	12
Total	30

Table 5: Type of intervention done

Type of intervention	Femoral fractures		Tibial fractures	
	No.	%age	No.	%age
Operative	18	100	6	50.00
Non-operative	0	0	6	50.00
Total	18	100.00	12	100.00

of implant used also affects radiation exposure. Fractures operated with plates compared to intramedullary nailing requires decreased radiation doses [11]. In only three patients, intramedullary nailing was done for femur fractures among 18 patients, and plating was done for rest15 patients. Tibia fractures, based on fracture pattern and displacement, can be managed conservatively with cast. Among 12 of tibia fractures, 6 needed operative management. Among 6 operated cases, 2 were operated with plating and 4 with interlocking nail tibia. Radiation dose used during all cases was minimal [12,13].

CONCLUSION

To conclude our study, we can say that, a multi-disciplinary approach is to be used for the successful management of lower limb fracture during pregnancy. The orthopedic surgeon must consider both operative and non-operative measures. Risk and benefits of operative treatment must be weighed carefully. Many fractures during pregnancy can be managed conservatively based on the fracture pattern and displacement. Also, we can delay the operative treatment until delivery is often a safe option. In fractures where surgical intervention is necessary, orthopedic surgeons must consider the physiologic changes that accompany pregnancy and the potential risks to the fetus. Surgeon must take care of the proper positioning of the patient, use of c-arm, radiation dose, and intraoperative fetal monitoring. Also, the risk associated with anesthetic agents, antibiotics, analgesics, anticoagulants must be considered. The left lateral decubitus position is considered to be safer as it decreases fetal hypotension. Overall we can say a multidisciplinary approach must be used, which includes orthopedic surgeons, obstetric specialists, anesthesiologists, general trauma surgeons, an emergency medicine team, and nursing staff.

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AUTHORS' CONTRIBUTION

All the authors contributed equally to the conductance of the study, writing and editing the article.

CONFLICTS OF INTERESTS

None of the authors have any conflicts of interest to be declared.

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